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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Docket No: Q58614

Kenichiro SATO, et al.

Appln. No.: 09/541,597

Group Art Unit: 1752

Confirmation No.: 4840

Examiner: R. ASHTON

Filed: April 3, 2000

For: POSITIVE PHOTORESIST COMPOSITION FOR FAR UNTRAVIOLET
EXPOSURE

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SUBMISSION OF EXECUTED DECLARATION UNDER 37 C.F.R. §1.132

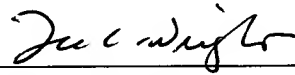
Commissioner for Patents
Washington, D.C. 20231

Sir:

Submitted herewith is an executed Declaration Under 37 C.F.R. §1.132
signed by Kenichiro SATO. An unexecuted version of this Declaration was filed
with the Amendment filed on November 18, 2002.

Respectfully submitted,

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Date: November 22, 2002



PATENT APPLICATION

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Kenichiro SATO et al

Appln. Serial No.: 09/541,597

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DECLARATION UNDER 37 C.F.R. §1.132

Commissioner for Patents
Washington, D.C. 20231

Sir:

I, Kenichiro Sato, do declare and state that:

I am a citizen of Japan,

I graduated from Osaka University, Faculty of Engineering,
Course of Applied Fine Chemistry in March of 1992;

Since April of 1992, I have been employed by Fuji Photo
Film Co., Ltd., where I have been engaged in research and development
in the technology of photoresist photosensitive materials for
semiconductors; and

I am a co-inventor of the above-identified application.

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In order to demonstrate the unexpected superiority achieved by the present invention over the disclosures of Goodall et al, Allen et al and Aoi et al, the following experimentation was carried out under my supervision and control.

The photoresist composition solutions were prepared as set forth in the examples of the specification, page 129, except that the ingredients shown in Tables 1 and 2 below were used.

COMPARATIVE EXPERIMENTATION

The inventive examples and comparative examples described in Table 1 below are photoresist compositions containing combinations of an acid decomposable resin, a photo-acid generator and a surface active agent (i.e., surfactant). The inventive examples are representative of the three components according to claims 4 to 8 of the present invention.

The symbols in the following Table 1 were corresponding to those described in Table 3 of the present specification. The resins which were within the scope of the present invention prepared by Synthesis Examples 56, 57 and 58 in Table 1 are those described in Goodall et al.

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TABLE 1

| | (B) Acid Decom- posable Resin | (A) Photo- acid Generat- or | Surface Active Agent | Number of Develo- pment Defects | Defocus Latitude Depended on Line Pitch | Particle (Initial Value) |
|-------------------------|--|--------------------------------------|----------------------------|---|--|--------------------------------|
| Example a | (1) | 1 | W-2 | 32 | 0.7 | 22 |
| Example b | Synthesis Example 56* | 1 | W-2 | 65 | 0.5 | 43 |
| Example c | Synthesis Example 57** | 1 | W-2 | 72 | 0.5 | 49 |
| Example g | Synthesis Example 58*** | 1 | W-2 | 58 | 0.5 | 39 |
| Comp. Example a' | (1) | 1 | None | 10200 | 0.1 | 1630 |
| Comp. Example b' | Synthesis Example 56* | 1 | None | 13100 | 0.1 | 2310 |
| Comp. Example c' | Synthesis Example 57** | 1 | None | 14300 | 0.1 | 3420 |
| Comp. Example g' | Synthesis Example 58*** | 1 | None | 8470 | 0.1 | 2190 |
| Comp. Example b'' | Synthesis Example 56* | 1 | W-4 | 3250 | 0.2 | 1130 |

: "56" means a compound synthesized in Example 56 of Goodall et al.

: "57" means a compound synthesized in Example 57 of Goodall et al.

: "58" means a compound synthesized in Example 58 of Goodall et al.

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That is, the effects of the present invention have not been known as the effects due to the surface active agent, and therefore the effects of the present invention are a specific effect due to the present invention.

Therefore, it is believed that the present invention can not be unexpected from and achieved by combination of Goodall et al which do not disclose the surface active agent of the claimed invention, and Allen and Aoi et al which do not disclose the resin of the claimed invention.

Also, the inventive examples and comparative examples described in Table 2 below are compositions containing combinations of an acid decomposable resin, a photo-acid generator and a solvent.

The inventive examples are representative of the three components according to claims 9 to 14 of the present invention.

The symbols in the following Table 2 were corresponding to those described in Table 5 of the present specification.

The resins which were within the scope of the present invention prepared by Synthesis Examples 56, 57 and 58 in Table 2 were those described in Goodall et al. The mixed Solvent S1/S3, which is within the scope of the present invention, is one described in Allen et al.

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TABLE 2

| <u>Example No.</u> | <u>(B) Acid Decomposable Resin</u> | <u>Solvent (Weight Ratio)</u> | <u>Particle (Initial Value</u> | <u>Particle Number after Storage</u> |
|--------------------|------------------------------------|-------------------------------|--------------------------------|--------------------------------------|
| Example d | (1c) | S1/S3 (80/20) | 35 | 19 |
| Example e-1 | Synthesis Example 56* | S1/S3 (75/25) | 80 | 25 |
| Example e-2 | Synthesis Example 56* | S1/S4 (80/20) | 72 | 21 |
| Example e-3 | Synthesis Example 56* | S2/S3 (70/30) | 95 | 39 |
| Example e-4 | Synthesis Example 56* | S3/S5 (60/40) | 93 | 28 |
| Example f | Synthesis Example 57** | S1/S3 (70/30) | 84 | 26 |
| Comp. Example d' | (1c) | PGMEA | 1200 | 19500 |
| Comp. Example e' | Synthesis Example 56* | PGMEA | 2210 | 20350 |
| Comp. Example f' | Synthesis Example 57** | PGMEA | 2510 | 22530 |
| Example h-1 | Synthesis Example 58*** | S1/S3 (80/20) | 65 | 32 |
| Example h-2 | Synthesis Example 58*** | S1/S4 (75/25) | 67 | 34 |
| Example h-3 | Synthesis Example 58*** | S2/S3 (70/30) | 72 | 39 |
| Example h-4 | Synthesis Example 58*** | S3/S5 (60/40) | 69 | 31 |
| Comp. Example h' | Synthesis Example 58*** | PGMEA | 640 | 13710 |

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- *: "56*" means a compound synthesized in Example 56 of Goodall et al.
- **": "57**" means a compound synthesized in Example 57 of Goodall et al.
- ***: "58***" means a compound synthesized in Example 58 of Goodall et al.

As is apparent from the results of the comparison between Example d and Comparative Example d', the comparison between Examples e-1 to e-4 and Comparative Example e', the comparison between Example f and Comparative Example f' and the comparison between Examples h-1 to h-4 and Comparative Example h', an unexpected and excellent effect in storage stability over time can be obtained by the combination of the claimed resin and the claimed mixture of solvent and amounts.

That is, as is apparent from the comparison between the particle initial value and the value of the particle number after storage, in the inventive examples, the particle number at the initial stage is unexpectedly less than those of the comparative examples and further the increase in particle number after storage (i.e., after the passage of time) is unexpectedly less.

Now, it has not been entirely reported that the excellent effects of the present invention (in which the particle number at the initial stage is less and the increase in particle number after storage is reduced) can be obtained by the (mixed) solvent.

